BUTTE PRIORITY SOILS OPERABLE UNIT
LEAD ABATEMENT PLAN

CITIZENS TECHNICAL ENVIRONMENTAL COMMITTEE
PROGRAM PROPOSAL

March 14, 2005

1.0 INTRODUCTION

The Citizens Technical Environmental Committee (CTEC) is pleased to present this program proposal for the lead abatement program as part of the final remedy for the Butte Priority Soils Operable Unit (BPSOU) of the Silver Bow Creek/Butte Area Superfund Site. CTEC presents this proposal to EPA to be used as a guideline for appropriate scheduling and funding of the lead abatement program in the Record of Decision (ROD) for the BPSOU.

The proposed lead abatement program is a comprehensive residential remediation program including remediation of hazardous wastes identified in Butte residences including lead (Pb), arsenic (As), and mercury (Hg) and in this respect the proposed program continues the tradition at the BPSOU of encompassing arsenic and mercury remediation under the lead abatement program. The proposed lead abatement program includes remediation of all residential sources of these contaminants related to historic mining and smelting as well as a lead paint abatement component.

The Butte – Silver Bow Health Department lead abatement program is currently taking steps to decide how to address issues covered in CTEC's proposal herein including scheduling of remediation and characterization of contaminated indoor dust. In this proposal CTEC does not intend to undermine the efforts of the Butte – Silver Bow lead abatement program. This proposal is intended to describe the components and remediation schedule of the final lead abatement program that CTEC deems necessary, and as such the proposal covers some of the actions proposed by the Butte – Silver Bow lead abatement program.

Lead paint abatement is not an enforceable cleanup agenda under Superfund; however, lead paint risk reduction can be an effective way of reducing total lead exposure

to humans. Inclusion of lead paint abatement with the remediation of lead contaminated soil and dust is an effective way of compensating for residual human exposure to lead that remains in mining and smelting contaminated areas after Superfund remediation is implemented. Because lead paint abatement is not authorized under Superfund, the potentially responsible party (PRP) must volunteer to implement and fund any lead paint abatement program. Often there are economic incentives for a PRP to fund lead paint abatement because removal of lead paint may be more cost effective or easier to implement than complete remediation of contaminated soils and dust (EPA OSWER directive #9355.4-12 and #9200.4-27P). The EPA OSWER directives state that the goal of the remedial action should be to lower the total lead exposure to an acceptable level, whether this is by remediation of soils to a safe level, or by combination of soil remediation with intervention of other sources such as lead paint and lead in drinking water.

This proposed program reflects CTEC's core position with respect to residential contaminants in the BPSOU including:

1) The lead abatement program must be aggressively implemented so that Butte residents are provided effective relief from exposure to mining and smelting contaminants in their homes as soon as possible.
2) The lead abatement program must actively seek to target residences for cleanup and not rely on property owners to initiate the remediation process.
3) Comprehensive testing must be performed to characterize the extent of soil and dust contamination in the greater Butte area and must not be limited to the boundary of the BPSOU.
4) Exposure pathways exist to contaminated dust in non-living space including attic dust and dust that emanates from cracks in walls and ceilings.
5) All contaminated dust in accessible areas of houses must be remediated such that the health of Butte residents is protected and property values are not adversely affected by the stigma of residual contamination.
6) Proposed lead remediation goals (RGs) for soil and dust in Butte residences were developed without consideration of several critical sources (drinking water, airborne lead, and paint ingestion) of lead exposure and may not be

protective of children's health. A reevaluation of lead RGs for soil and dust that consider all sources of child lead exposure is needed.

7) Proposed arsenic RGs for soil and dust in Butte residences correlate to an unacceptable cancer risk of 1 in 10,000. CTEC does not believe that there is community support for this level of cancer risk from contaminants left in place. Arsenic RGs should be developed so that not one of the 34,400 Butte residents has an elevated risk of cancer from arsenic exposure.

2.0 PROGRAM COMPONENTS

2.1 Contaminant Hazard Characterization

This section describes residential sampling and characterization of soil and indoor dust contamination.

2.1.1 Characterization of Residential Contamination.

CTEC maintains that currently, there is an inadequate understanding of the extent of residential contamination in the Butte area. Soil and dust sampling to date has not been incorporated into a site-wide characterization of residential contaminant hazards. Characterization of the extent of contamination within the BPSOU should be used to determine whether aerial deposition of contaminants from mining and smelting within the BPSOU extended beyond the boundary of the BPSOU. Severe dust contamination of residential attics is reported from Walkerville and Butte to Anaconda and the connection between contamination at the BPSOU and in the surrounding areas outside of the BPSOU is unknown. CTEC recommends that sampling of residential soils and indoor dust for contamination must not be limited to the political boundary of the BPSOU.

A comprehensive residential hazard characterization must be undertaken concurrently with the sampling program. Analytical results from the sampling program should be incorporated into a geographic information system (GIS) database as sampling results are completed. The GIS database will allow record keeping of sampling analytical results in a spatial database. The primary goals of the GIS spatial analysis are:

1) Characterization of the extent of contamination and identification of patterns of contamination related to source areas including former mill and smelter sites or other contaminant sources.
2) Identification of areas of residential contamination coincident with at-risk populations such as children under 6 years old so that structures with at-risk residents can be prioritized for sampling and abatement efforts.
3) Assessment of residential hazard potential outside of the boundary of the BPSOU from sources of contamination related to historic mining and smelting activities within Butte and surrounding areas.

2.1.2 Characterization Schedule.

The lead abatement program must provide for aggressive systematic sampling for contaminants of concern in all potentially affected residences in Butte. Information available from the current Butte – Silver Bow Lead Abatement Program suggests that there are approximately 2000 unsampled residences within the BPSOU. CTEC recommends that a goal of the sampling program be to characterize the contaminant hazard in at least 90% (approximately 1800) unsampled Butte residences within 3 years. The realization of sampling 1800 Butte residences in a 3-year timeframe is dependent on resident and property owner cooperation and support of the characterization program. Section 2.3 below describes public outreach intended to promote public involvement in the sampling and remediation process. A proposed comprehensive program schedule is shown in table 1 on page 13.

2.2 Removal of Contaminants

This section describes components of the proposed lead abatement program that address removal of contaminants from Butte residences.

2.2.1 Soil Action Levels for Lead, Arsenic and Mercury

CTEC is concerned that EPA proposed soil remediation goals (RGs) for lead and arsenic will allow for hazardous levels of contamination to remain in Butte residential soils. EPA proposed lead RGs developed using EPA's Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK model) do not address critical child lead

exposure pathways and will likely underestimate probable child lead poisoning frequency. CTEC recommends that final lead RGs be developed which consider the following:

1) Direct ingestion of lead paint by children. Lead paint ingestion should be considered a critical source of exposure given Butte's old housing stock. CTEC recommends that final RGs be developed by using information available on lead paint ingestion from areas with a similar percentage of old housing stock and/or with a comparable occurrence of deteriorated or exposed lead paint that a child can ingest.
2) The Baseline Risk Assessment for Lead (CDM, 1994) shows that average lead concentration in Butte drinking water is 1.7 times the national average based on 147 residential tap water samples within the BPSOU. Final RGs should be developed considering site-specific lead concentrations in drinking water.
3) Airborne lead concentrations used in the BPSOU IEUBK model are national averages and are based on the default assumption that indoor airborne lead concentration is 30% of outdoor airborne lead concentration. This assumption ignores indoor sources of lead in Butte that may contribute to elevated airborne lead concentration such as contaminated dust and outdoor lead sources that may be transported by wind such as waste and soil in which elevated lead concentrations remain. Site-specific indoor and outdoor airborne lead concentrations should be measured under typical conditions of particulate emission and included in the IEUBK model.
4) Appropriate lead RGs can be developed that consider the eventual remediation of lead based paint hazard, lead in drinking water, and airborne lead if it can be determined that the PRP will fund components of the lead abatement program to address these exposure pathways in all residences within a 10-year timeframe.
5) The studies of bioavailability of lead in soil to children use rats and pigs for comparison to human bioavailability. CTEC is concerned that these studies which use animals may not accurately assess human lead uptake. The rat and pig studies determine that lead in Butte soil is 1/3rd as bioavailable as the

IEUBK default lead bioavailability. The 10% and 12% bioavailability parameters used in the RAs need to be supported by comparison to bioavailability determined from scientific studies performed in other areas to show that these are conservative estimates of bioavailability from soil. If further data is not provided that adequately supports the low bioavailability parameter used for Butte soils, CTEC recommends use of the default bioavailability factor in developing final RGs.

6) The bioavailability studies involved exposing animals to mixtures of Butte soils. EPA Superfund guidance OSWER directive #9355.4-12 in the section titled Implementation - Mining-related sites states, "for mining-related sites *without* significant past smelting/mill activity, this interim directive encourages further research for characterizing the potential impact of particle size and speciation on soil bioavailability." CTEC contends that it is an under sight of the bioavailability studies to consider only soil exposure when much of the lead exposure in Butte is a result of past smelter and mill activity. CTEC recommends that further bioavailability studies are needed that address bioavailability to dust from smelter and mill sources. If further data is not provided that adequately supports the low bioavailability parameter used for Butte dust, CTEC recommends use of the default bioavailability factor in developing final RGs.
7) The proposed action levels for indoor dust are the same as the lead action levels determined appropriate for outdoor soil. There is potentially more risk with having contaminated dust coming out of cracks in the wall in a child's bedroom than in exposure to outdoor dirt. Lead RGs for indoor dust should be developed independently from RGs for outdoor soil.

CTEC recommends that the IEUBK model be calibrated to data from Butte as sufficient data becomes available. Calibration of the IEUBK model should consider the additional site-specific lead concentrations and exposure pathways addressed in the previous paragraphs and will involve an iterative process where parameters that have a high degree of uncertainty including bioavailability of lead from soils and dust and the

soil/dust ingestion weighting factor are adjusted to match measured child blood levels. EPA should include at their discretion other parameters of high or unknown uncertainty to include in the calibration process.

EPA calculates that the proposed RGs for arsenic amount to a 1 in 10,000 cancer risk, the highest cancer risk allowed under EPA Superfund guidance. Proposed RGs for arsenic of 250 mg/kg are approximately 15 times the maximum estimated background levels of arsenic in soil at surrounding non-impacted communities in the Helena Valley, Philipsburg, Townsend, and Livingston (EPA, 1996). Arsenic RGs should be developed so that not one of the 34,400 Butte residents has an elevated risk of cancer from arsenic exposure. CTEC suggests that an RG for arsenic in residential soils that corresponds to a 1 in 100,000 cancer risk is more appropriate.

Mercury RGs proposed by EPA are 147 mg/kg in residential soil and 0.43 mg/m^3 in indoor vapor. It is stated in the Human Health Risk Assessment Walkerville Residential Site (URS, 2003) that mercury in Butte soils and vapor is not carcinogenic. CTEC has not reviewed the proposed mercury RGs and assumes that this action level is protective of human health.

The reduction in lead and arsenic RGs described above will result in the need for more residential sites to be remediated. This will increase the funding needed for the lead abatement program. However, CTEC feels that it is paramount to protect human health. Current proposed RGs have tended towards being lenient on the protection of human health.

2.2.2 Residential Soil and Dust Remediation

Remediation of yard and basement soil should be accomplished by the following:

1. Excavation and removal to a repository all yard and residential outdoor soil above RGs to a depth of 18 inches and replacement with clean fill and topsoil.
2. Vegetation disturbed in the process should be replanted.
3. Removal of basement soils where cost effective, otherwise capping with a durable synthetic barriers capable of preventing particulate and mercury vapor transmission.

4. Abatement of exterior lead paint where a potential exists for recontamination of remediated soils.

Remediation of indoor contaminated dust should be accomplished by the following:

1. Establishing alternate lodging and meals and incidental expense per diem allowances for residents while remediation is occurring. The program should seek bids from local lodging establishments to contract as a primary lodging source.
2. Remediation of all accessible contaminated non-living space dust by appropriate measures. Remediation must include removal of contaminated dust from accessible non-living space including but not limited to attics, crawlspaces and heating ducts. Inaccessible contaminated dust that can enter living space or recontaminate non-living space should be addressed by sealing of cracks, placement of durable synthetic impermeable barriers, or other effective measures. Removal of residual contamination must accompany housing remodeling when contaminated dust is accessible.
3. Removal of all living space contaminated dust by appropriate measures. CTEC recommends that living space contamination be addressed after remediation of non-living space and yards to prevent any recontamination of living space from dust and soil that is disturbed during cleanup.
4. With PRP cooperation, the lead program should be funded to address lead based paint and lead in drinking water by appropriate measures.

One of CTEC's main concerns is that the remediation performed by the lead abatement program is able to effectively counter any declines in property values caused by the perception that Butte residences are unsafe. CTEC maintains that a certificate of remediation must be produced that describes the sample results for a residence, the details of remediation performed, and recognition that the house is safe for occupation. The certificate must be attached to the deed for the property. CTEC believes that public documentation of residential cleanup and issuance of a certificate is necessary to protect and enhance Butte property values.

2.2.3 Remediation Schedule

The people of Butte have lived for too long in the metal and arsenic laden soot of past smelter smoke fallout and mining and milling waste. CTEC contends that all accessible areas of residences in Butte should be cleaned of hazardous dirt and dust within a time frame of 10 years. Data collected by the characterization program will be used to prioritize residences for cleanup based on a relative risk analysis that considers age of resident children and contaminant levels. It should be the goal of the lead abatement program to remediate all residences with children under 6 years old within a 5-year period. Remaining residences in which an owner requests remediation can then be addressed within years 5 – 10 of the program. Currently, the BSB lead abatement program estimates that 40% of the houses sampled require some level of remediation. Considering final RGs may be lower than current action levels, CTEC estimates that 50% or 1000 residences will require some form of yard or indoor dust remediation. A remediation rate of 100 residences per year should provide for the goal of a 10-year cleanup.

Due to the fact that some owners will not want to have remediation work performed on their property and considering future remodel dust abatement requirements as well as other unforeseen occurrence of contamination, it should be anticipated that the lead abatement program be funded for at least 30 years. Management of the program will need to be flexible so that resources are available to address the number of residences that are remediated annually. It should be considered a goal of the program to remediate at least 80% of all contaminated residences within a 10-year timeframe which allows for a rate of 20% of owners initially declining remediation. The program should anticipate operating at a reduced level from years 10-30 to account for treatment of properties not initially remediated as well as properties undergoing future remodeling and renovation or demolition. A proposed comprehensive program schedule is shown in table 1 below on page 13.

2.3 Public Education and Community Outreach

2.3.1 Public Outreach Needs

This section describes components of the lead abatement program that address community awareness of residential lead, arsenic, and mercury hazards. The efficacy of the lead abatement program lies in participation of the community to the maximum extent possible. CTEC is concerned that the Butte community does not currently have adequate access to education about lead, arsenic, and mercury hazards or the Superfund cleanup process.

To achieve community education about residential contaminant hazards and to foster community support and participation in the lead abatement program, CTEC recommends an aggressive public outreach campaign. Careful attention is needed to explain the intricacies of the Superfund residential cleanup so that property owners and renters are aware of their rights when consenting to a contamination characterization test and cleanup. Funding should be available to hire a public relations firm to work with the management of the lead abatement program to develop an adequate media and outreach campaign. Outreach will need to be adaptative so that it addresses successes and problems encountered in meeting the goal of universal community understanding and acceptance of the residential hazard abatement. CTEC recommends that the outreach emphasize:

1. Explanation that property owners are not responsible for costs of cleanup or liable for past exposure to contaminants.
2. Explanation that requesting residential remediation will result in tangible health benefits and protection and enhancement of property values.
3. Explanation that any renter within the Butte community has the right to request documentation of contaminant characterization and cleanup measures performed on a rental unit.
4. Recognition that testing and cleanup is performed by Butte – Silver Bow and local contractors and that federal agencies are not involved in the remedy implementation.

5. Explanation of risks and potential health effects to children concerning exposure to lead from mining and smelting waste and the synergistic lead exposure when lead paint, plumbing or other sources are present.
6. Explanation of risks and potential health effects to all residents from arsenic and mercury including estimated cancer risks from potential existing levels of arsenic in soil and dust.
7. Community pride, use of slogans such as "Butte Deserves the Best", and other information so that the community understands that the future beyond Superfund cleanup will be healthy and prosperous.
8. Description of contaminated indoor dust, where contaminated dust typically occurs, and what steps to take if it is discovered. Descriptions should include pictures of typical contaminated dust sources.
9. History of mining and smelting in Butte, the value of those industries and benefits to the nation, and simple explanation of how soils and residences became contaminated.
10. Establishment of a recognizable trademark that people associate with the lead abatement program.

2.3.2 Public Outreach Schedule

Public outreach will be most effective if it combines a component of mass media exposure including television and newspaper promotion with more in-depth public meetings and literature.

CTEC recommends that mass media outreach include brief and concise advertisement of the lead abatement program. CTEC recommends the program advertise for the initial 18 months of program operation on local television and in local newspapers with at least the following frequency:

1. Once daily during local news broadcasts.
2. Once daily with a roving time during prime time television.
3. Once weekly during the workweek in the Montana Standard.
4. Once weekly in the Montana Standard Sunday Edition.

The program should seek to advertise on several television networks to capture a larger audience.

In-depth information will necessarily cover the details of the lead abatement program. In-depth information can be provided in pamphlets and brochures available from sources including Butte – Silver Bow, EPA, CTEC, on the Internet, and by mail. During the initial 2 years of the program well-advertised public meetings should be held biannually at which the public can learn from presentations about the schedule and activities of the lead abatement program. Additionally, the public should have the opportunity to comment on the lead abatement program and comments should be incorporated into refining program effectiveness.

After the first 18 months of program operation the program should determine the efficacy of the initial level of advertising and advertising may be reduced. CTEC recommends that for the first 10 years of program operation that advertising not be reduced to a level below once per month in the Montana Standard Sunday Edition and once per week during local new broadcasts. A proposed comprehensive program schedule is shown in table 1 below on page 13.

During the first year of the lead abatement program the program may rely on requests from property owners to schedule testing and remediation; however the program must prioritize tested sites for remediation as described in section 2.2.3. After the first program year, the program should actively contact property owners by telephone to request if the property owner has information on the program and to request if the property owner would agree to a contaminant characterization; properties should continue to be prioritized for remediation as described in section 2.2.3. A primary goal of the program should be to solicit the opportunity to test every residence within the BPSOU.

3.0 Butte – Silver Bow Program Control

It is CTEC's position that the Butte – Silver Bow Health Department should continue to manage the lead abatement program. As described in section 2.1.2, reasonable estimates suggest that at least 2000 residential yards and interiors within the BPSOU need to be tested. Currently, the Butte – Silver Bow lead abatement program estimates that 40% of residences sampled show some level of contamination suggesting

that the program should anticipate the need to remediate at least 800 residences. The current possible workload of the Butte – Silver Bow lead abatement program is approximately 50 residential cleanups annually. To provide for remediation of all residences within a 10-year timeframe the lead abatement program needs to be expanded to allow for remediation of 100 residences annually. This may necessarily entail doubling the annual funding of the program for the first 10 years. The increased funding should allow for twice the current 3-4 full time employees of the program and increased contractor expenses. Butte – Silver Bow has expressed concern that current local contractor resources are maximized and there are not an adequate number of trained and available contractors necessary to provide for a more aggressive program. CTEC believes that if the BPSOU ROD is explicit in ordering remediation of all residences possible within a 10-year time frame that contractors will have adequate time to hire and train additional employees. Additionally, if local contractors are unable to provide for the necessary increased productivity, Butte – Silver Bow should expand their contracted workforce.

Table 1: Schedule	*0-6 months*	*6-12 months*	*12-18 months*	*18 months-2 years*	*2-3 years*	*3-5 years*	*5-10 years*	*10-30 years*
Residential sampling	300 residences	300 residences	300 residences	300 residences	600 residences	as needed	as needed	as needed
Residential hazard and dust characterization	Coincident with residential sampling	Coincident with residential sampling	Coincident with residential sampling	Coincident with residential sampling	Complete preliminary characterization			
Evaluation of lead (Pb) RGs	IEUBK model total lead exposure	Calibration of IEUBK model	Calibration of IEUBK model	Calibration of IEUBK model	Complete calibration of IEUBK model			
Evaluation of arsenic (As) RGs	Determine final As RGs							
Residential remediation	100 residences/yr (priority households)	100 residences/yr (priority households)	100 residences/yr (priority households)	100 residences/yr (priority households)	100 residences/yr (priority households)	100 residences/yr (priority households)	100 residences/yr	as needed
Public meetings	1 meeting every 6 months	1 meeting every 6 months	1 meeting every 6 months	1 meeting every 6 months	As needed	As needed	As needed	As needed
Program outreach: television advertising	Daily 1 local news and 1 primetime	Daily 1 local news and 1 primetime	Daily 1 local news and 1 primetime	As needed	As needed	As needed	As needed	As needed
Program outreach: newspaper advertising	Twice weekly 1 workweek, 1 Sunday edition	Twice weekly 1 workweek, 1 Sunday edition	Twice weekly 1 workweek, 1 Sunday edition	As needed	As needed	As needed	As needed	As needed

4.0 Estimated Budget

Table 2 below presents an estimated budget for the proposed program. Actual costs will depend on final RGs for lead and arsenic. The estimated budget considers estimated average per residence costs for remediation from the current BSB Lead

Abatement Program. The BSB Lead Abatement Program estimates that under current PRGs 40% of houses sampled require some level of remedial response. Final RGs may be lower than current action levels and therefore table 2 includes the assumption that the frequency of houses needing a remedial response will increase to 50% under more protective RGs. The estimate of 50% of residences needing remediation should be considered an approximation; comparison of the distribution of sampled residential concentrations of contaminants of concern will need to be compared to final RGs to arrive at a more accurate estimation of the number of houses requiring a remedial response. The budget includes cost estimates for remediation only within the BPSOU and does not consider costs incurred for sampling or remediation outside of the BPSOU. Additionally, the estimated budget does not include costs for the residential hazard characterization described in section 2.1.

Table 2: Estimated Budget	**Unit cost** (1)	**# residences** (2)	**Frequency** (3)	**Years 1 - 10**	**30 year cost**
Program costs: yard	$10,000.00	2000	50%	$8,000,000	$10,000,000.00
Program costs: indoor	$14,000.00	2000	30%	$6,720,000	$8,400,000.00
	monthly cost (4)	**# months**		**Years 1 - 10**	**30 year cost**
Outreach: first 18 months	$12,000.00	18		$216,000.00	$216,000.00
Outreach: 18 months to 10 years	$900.00	102		$91,800.00	$91,800.00
			Total Cost (5)	$15,027,800	$18,707,800

(1) Program unit costs for yard and indoor remediation are current estimated costs of the BSB Lead Abatement Program plus a supplemental $2000 per residence to include removal of non-living space "attic" dust. Estimates include sampling, remediation, and administrative costs.
(2) # Residences remaining unsampled estimated by BSB Lead Abatement Program.
(3) Frequency is the occurrence of sampled residences needing remediation. Value based information from BSB Lead Abatement Program and is adjusted for CTEC's proposed reevaluation of final RGs for lead and arsenic.
(4) Outreach costs estimated by CTEC and do not include public meeting costs. Outreach costs for first 18 months include $36,000 to hire a public advertising firm.
(5) Costs are in 2005 dollars and are not adjusted for a discount rate.

Referenced Documents:

CDM. 1994. BASELINE RISK ASSESSMENT FOR LEAD EXPEDITED RESPONSE ACTION PRIORITY SOILS OPERABLE UNIT.

EPA. 1994. OSWER Directive #9355.4-12 August 1994 Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities.

EPA. 1996. Record of Decision Anaconda Co. Smelter; EPA ID: MTD093291656; OU 16; Anaconda, MT.

EPA. 1998. OSWER Directive #9200.4-27P August 1998 Clarification to the 1994 revised interim soil lead (Pb) guidance for CERCLA sites and RCRA corrective action facilities.

URS Operating Services, Inc. 2003. Final Human Health Risk Assessment Walkerville Residential Site Walkerville, Montana.